

MID TO LATE CRETACEOUS DIVERSITY OF ANGIOSPERM FLORAL STRUCTURE AND IMPLICATIONS FOR THE HISTORY OF POLLINATION MECHANISMS

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For most of the Twentieth Century the angiosperm archetypal flower has been viewed as relatively large, multiparted, with spirally arranged fleshy appendages, and as being probably beetle pollinated as in some extant Magnoliales. However, the preponderance of fossil evidence indicates that flowers with such characters do not appear until the mid-Cretaceous, well after smaller simpler fossil flowers such as platanoids and chloranthoids. Winteraceous and Chloranthaceous pollen appears more or less simultaneously in the Lower Cretaceous, but rapidly mounting evidence for mosaicism in Cretaceous taxa makes it unwise to extrapolate floral structure on the basis of dispersed pollen. Mid-Late Cretaceous fossils illustrate an increasing proportion of simple flowered Rosidae in the angiosperm flora. We report new fossil evidence of charcoalified flowers and fruits representing at least 20-30 diverse angiosperm taxa from the Cenomanian and Turonian deposits of the Atlantic Coastal Plain. These fossil flowers include representatives with hypanthia and floral cups, sympetaly, syncarpy, inferior ovaries, campylotropous ovules, nectaries of various forms, specialized anther dehiscence, epipetalous stamens, and connate filament tubes. Major taxonomic groups (as defined by Cronquist) represented by these fossils include Dilleniidae, Magnoliidae, Rosidae, monocots, and possibly Caryophyllidae. Thus, the early Late Cretaceous angiosperm flora had greater floral diversity than has previously been documented. This array of floral structures includes features that are now associated with bees and other specialized insect pollinators, thus providing a new perspective on the evolution of insect pollination.